IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Charles M. Link II and Donald M. Cardina

Serial No.: N/A   **Group Art Unit:** N/A
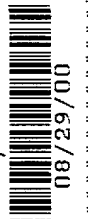
Filing Date: Herewith   **Examiner:** N/A

For: ROAMING VIRTUAL LONG DISTANCE

> **EXPRESS MAIL LABEL NO: EL568027875US**
> **DATE OF DEPOSIT: August 29, 2000**

Box ☒ Patent Application

☐ Provisional   ☐ Design

Assistant Commissioner for Patents
Washington DC 20231

Sir:

PATENT APPLICATION TRANSMITTAL LETTER

Transmitted herewith for filing, please find

☒ A Utility Patent Application under 37 C.F.R. 1.53(b).

It is a continuing application, as follows:

☐ continuation   ☐ divisional   ☐ continuation-in-part of prior application number
___/_____.

☐ A Provisional Patent Application under 37 C.F.R. 1.53(c).

☐ A Design Patent Application (submitted in duplicate).

Including the following:

☐   Provisional Application Cover Sheet.

☒   New or Revised Specification, including pages __1__ to __23__ containing:

    ☒   Specification

    ☒   Claims

    ☒   Abstract

    ☐   Substitute Specification, including Claims and Abstract.

        ☐   The present application is a continuation application of Application No. _____ filed _____. The present application includes the Specification of the parent application which has been revised in accordance with the amendments filed in the parent application. Since none of those amendments incorporate new matter into the parent application, the present revised Specification also does not include new matter.

        ☐   The present application is a continuation application of Application No. _____ filed _____, which in turn is a continuation-in-part of Application No. _____ filed _____. The present application includes the Specification of the parent application which has been revised in accordance with the amendments filed in the parent application. Although the amendments in the parent C-I-P application may have incorporated new matter, since those are the only revisions included in the present application, the present application includes no new matter in relation to the parent application.

☐   A copy of earlier application Serial No. _____ Filed _____, including Specification, Claims and Abstract (pages 1 - @@), to which no new matter has been added TOGETHER WITH a copy of the executed oath or declaration for such earlier application and all drawings and appendices. Such earlier application is hereby incorporated into the present application by reference.

☐   Please enter the following amendment to the Specification under the Cross-Reference to Related Applications section (or create such a section) : "This Application: ☐ is a continuation of ☐ is a divisional of ☐ claims benefit of U.S. provisional Application Serial No. _____filed _____

_____

_____

_____ .

☐   Signed Statement attached deleting inventor(s) named in the prior application.

☐   A Preliminary Amendment.

☒   ___4___ Sheets of ☒ Formal ☐ Informal Drawings.

☐   Petition to Accept Photographic Drawings.

        ☐   Petition Fee

☒   An ☐ Executed ☒ Unexecuted Declaration or Oath and Power of Attorney.

☐   An Associate Power of Attorney.

☐   An ☐ Executed ☐ Copy of Executed Assignment of the Invention to _____

_____ .

        ☐ A Recordation Form Cover Sheet.

        ☐ Recordation Fee - $40.00.

☐   The prior application is assigned of record to _____

☐   Priority is claimed under 35 U.S.C. § 119 of Patent Application No. _____
filed _____ in _____ (country).

        ☐ A Certified Copy of each of the above applications for which priority is claimed:

           ☐ is enclosed.

           ☐ has been filed in prior application Serial No. _____ filed _____ .

☐   An ☐ Executed or ☐ Copy of Executed Earlier Statement Claiming Small Entity Status under 37 C.F.R. 1.9 and 1.27

        ☐ is enclosed.

        ☐ has been filed in prior application Serial No. _____ filed _____ ,
said status is still proper and desired in present case.

☐   Diskette Containing DNA/Amino Acid Sequence Information.

☐   Statement to Support Submission of DNA/Amino Acid Sequence Information.

☐   The computer readable form in this application _____, is identical with that filed in Application Serial Number _____, filed _____. In accordance with 37 CFR 1.821(e), please use the ☐ first-filed, ☐ last-filed or ☐ only computer readable form filed in that application as the computer readable form for the instant application. It is understood that the Patent and Trademark Office will make the necessary change in application number and filing date for the computer readable form that will be used for the instant application. A paper copy of the Sequence Listing is ☐ included in the originally-filed specification of the instant application, ☐ included in a separately filed preliminary amendment for incorporation into the specification.

☐   Information Disclosure Statement.
      ☐   Attached Form 1449.
      ☐   Copies of each of the references listed on the attached Form PTO-1449 are enclosed herewith.

☐   A copy of Petition for Extension of Time as filed in the prior case.

☐   Appended Material as follows: _____ .

☒   Return Receipt Postcard (should be specifically itemized).

☐   Other as follows: _____

_____

_____ .

FEE CALCULATION:

☐   Cancel in this application original claims _____ of the prior application before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)

		SMALL ENTITY		NOT SMALL ENTITY	
		RATE	FEE	RATE	FEE
PROVISIONAL APPLICATION		$75.00	$	$150.00	$
DESIGN APPLICATION		$155.00	$	$310.00	$
UTILITY APPLICATIONS BASE FEE		$345.00	$	$690.00	$690.00
UTILITY APPLICATION; ALL CLAIMS CALCULATED AFTER ENTRY OF ALL AMENDMENTS					
	No. Filed	No. Extra			
TOTAL CLAIMS	22- 20 =	2	$9 each	$	$18 each	$36.00
INDEP. CLAIMS	4- 3 =	1	$39 each	$	$78 each	$78.00
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM		$130	$	$260	$
ADDITIONAL FILING FEE			$		$
TOTAL FILING FEE DUE			$		$804.00

☒   A Check is enclosed in the amount of $ 804.00 .

☒   The Commissioner is authorized to charge payment of the following fees and to refund any overpayment associated with this communication or during the pendency of this application to deposit account 23-3050. This sheet is provided in duplicate.

    ☐   The foregoing amount due.

    ☒   Any additional filing fees required, including fees for the presentation of extra claims under 37 C.F.R. 1.16.

    ☒   Any additional patent application processing fees under 37 C.F.R. 1.17 or 1.20(d).

    ☐   The issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance.

☒   The Commissioner is hereby requested to grant an extension of time for the appropriate length of time, should one be necessary, in connection with this filing or any future filing submitted to the U.S. Patent and Trademark Office in the above-

identified application during the pendency of this application. The Commissioner is further authorized to charge any fees related to any such extension of time to deposit account 23-3050. This sheet is provided in duplicate.

SHOULD ANY DEFICIENCIES APPEAR with respect to this application, including deficiencies in payment of fees, missing parts of the application or otherwise, the United States Patent and Trademark Office is respectfully requested to promptly notify the undersigned.

Date: **August 29, 2000**

Vincent J. Roccia
Registration No. **43,887**

Woodcock Washburn Kurtz
Mackiewicz & Norris LLP
One Liberty Place - 46th Floor
Philadelphia PA 19103
Telephone: (215) 568-3100
Facsimile: (215) 568-3439

© 1997 WWKMN

ROAMING VIRTUAL LONG DISTANCE

Technical Field

5   The present invention relates to the field of mobile communications. More specifically, the present invention relates to the field mobile communications initiated while outside a home market network (*i.e.,* "roaming").

Background of the Invention

10   Wireless communication has become an important fixture of everyday life. Mobile telephones and wireless pagers, for example, have become nearly indispensable items. This is especially true in the business world where wireless communication permits a company to be in continuous contact with its clients. In its infancy, wireless communications initiated from locations beyond the subscriber's home market were rare,

15   due to technical and economic limitations. However, as society became more mobile, there was an increased demand to make wireless communication initiated out of the home market network more available and less costly.

       The increased demand has been met by a number of wireless providers competing to satisfy the mobile economy without dramatically increasing consumer costs. In order

20   to maintain their share of the market, wireless providers have offered their mobile customers simplified rate schedules. For example, BellSouth's single rate plan allows

wireless customers to pay a single rate, regardless of whether the call originates from the customer's home market. Other wireless providers also have eliminated or reduced additional "roaming" charges (*i.e.,* calls made by a customer while out of the wireless provider's local network), or provided for the pre-payment of such roaming charges.

5   Although the wireless providers have eliminated or reduced the roaming charges to their customers, these additional fees often are offered at considerable expense to the wireless provider. This is because in order for roaming to occur, the foreign market network (*i.e.,* the system in whose geographic area the wireless telecommunications unit has originated) must first agree to provide service to the wireless telecommunications

10   unit. As such, the home market provider is at the mercy of the foreign market provider to complete its customer's call. As a result, roaming agreements must be entered into at great costs to the home market provider.

Therefore, it would be advantageous to provide a system and a method for allowing home market carriers to connect their customer's long distance wireless

15   communications without incurring the foreign market carrier's additional connection fees.

Summary of the Invention

The invention provides a system and a method for connecting an out-of-market

20   customer to a desired telephone number. The method comprises receiving a customer

validation request from a foreign market provider and, in return, providing a random or

designated toll-free telephone number to the foreign market provider. Upon receiving a

call request from the foreign market provider, the call request is directed to the desired

telephone number. The customer validation request may include the desired telephone

5   number and/or a mobile identification number. The call request is based on the provided

toll-free telephone number, which is owned by a home market provider.

The system comprises a home mobile switching center in communication with a

foreign mobile switching center, and a service switching point in communication with the

home mobile switching center and with the desired telephone number. The system

10   further comprises a service control point in communication with the service switching

point. The service control point instructs the service switching point to route a call

request received from the foreign mobile switching center to the desired telephone

number.

In another embodiment, the invention includes a wireless telephone device for

15   connecting an out-of-market customer to a desired telephone number. The wireless

telephone device comprises a computer-readable medium having computer-executable

instructions thereon for determining whether the wireless telephone device is out of a

home market. The computer-executable instructions include receiving a desired

destination telephone number and transmitting a call request to a toll-free telephone

20   number in response to the desired telephone number when the wireless telephone device

is out of a home market. The computer readable medium of the wireless telephone

device may have further computer-executable instructions for transmitting the desired

destination telephone number with the call request to the toll-free telephone number, or

transmitting the desired number in response to a request directed from the toll-free

5   telephone number. Alternatively, the device may have further computer-executable

instructions thereon for querying a user to re-enter the desired destination telephone

number in response to a request directed from the toll-free telephone number.

10   **Brief Description of the Drawings**

Other features of the invention are further apparent from the following detailed

description of presently preferred embodiments of the invention taken in conjunction

with the accompanying drawings, of which:

Figure 1 is an overview of a network of mobile telecommunications systems;

15   Figure 2 is a message flow diagram illustrating the registration process that occurs

when a mobile subscriber makes a call while within a foreign market network;

Figure 3 is a message flow diagram illustrating the messaging that occurs when

the mobile subscriber makes a call while within the foreign market network, according to

the invention; and

20   Figure 4 is a flow diagram illustrating a wireless telephone device, according to

the invention.

Detailed Description of the Invention

Mobile Telecommunications System Overview

Figure 1 is an overview of a network of mobile telecommunications systems.

5   Mobile telecommunications network 100 includes a foreign mobile switching center

(MSC) 103 and a home MSC 101. Foreign MSC 103 performs switching operations for

base station 108 through communication path 113. A communication path refers to any

medium for transmitting a message. The message may be data, voice and/or video

information in an analog or a digital format. Although not illustrated in Figure 1, home

10   MSC 101 is able to perform switching operations for a plurality of base stations, as well.

Home MSC 101 and foreign MSC 103 are interconnected by a data network represented

by communications path 105. It should be noted that no particular type of network

protocol or network topology is intended to be represented by communications path 105.

Communications path 105 is provided to indicate that each MSC is able to communicate

15   data to another MSC using some form of data communication.

Communication between foreign MSC 103 and home MSC 101 is conducted

using IS-41 protocol. IS-41 is an interim standard created by the Electronic Industry

Association/Telecommunications Industry Association ("EIA/TIA") that defines

communications between disparate mobile telecommunications systems, like home

20   market network 114 and foreign market network 113 (The EIA/TIA has published

Interim Standard 41, Revisions A, B and C. Copies of these are available from the

Electronic Industries Association, 2001 Pennsylvania Ave., N.W., Washington, D.C.

2006. The IS-41 standards, including all revisions, are hereby incorporated in their

entirety by this reference.). IS-41 enables home MSC 101 to communicate with foreign

5   MSC 103, so as to transmit validation and customer profile information for roaming

subscriber 120. In particular, the IS-41 standard permits a communications exchange for

verifying whether a mobile caller is a valid service customer. The embodiment is

described through the use of messages and response messages that conform to the IS-41

standard. The IS-41 message may be transported between many MSCs that use various

10   network communications protocols. Such protocols include the Signal System 7 (SS7)

protocol, X.25 protocol and frame relay protocols. Nevertheless, those skilled in the art

will understand that the principles of the present invention may be implemented through

the use of other signaling protocols. In particular, the following set of IS-41 messages

are used for validation and customer profile information: (1) Registration Notification

15   ("REG.$_{NOT}$"); (2) Qualification Request ("QUAL.$_{REQ}$"); (3) Qualification Directive

("QUAL.$_{DIR}$"); (4) Service Profile Request ("SRV.$_{PRF.DIR}$"); (5) Service Profile Directive

("SRV.$_{PRF.REQ}$"); (6) Return Result; and (7) Origination Request.

Home MSC 101 and foreign MSC 103 also may be connected to a public service

telephone network (PSTN) 102. Additionally, it should be noted that communications

20   path 105 may be included as a portion of PSTN 102 or as a dedicated connection. A

mobile subscriber 120 is assigned to home MSC 101. Therefore, MSC 101 is located

within mobile subscriber's 120 "home market network" 114. However, in the example

illustrated in Figure 1, mobile subscriber 120 is travelling within a "foreign market

network" 113 in which foreign MSC 103 is located. Therefore, mobile subscriber 120 is

5　"roaming" out of home market network 114.

Home MSC 101 is coupled to a home location register (HLR) 121. A service

provider uses an HLR to maintain a service profile for each of its mobile subscribers. A

service profile includes information about the services to which a mobile user has

subscribed, as well as other data necessary to provide a desired service. For example, a

10　service profile may include information regarding one or more of the following: call

forwarding, call waiting, three-way conferencing, calling features indicator, origination

indicator, digits restriction, termination restriction code, digits carrier, routing digits,

geographic authorization, authentication capability, mobile directory number, message

waiting notification count, message waiting notification type, origination triggers,

15　preferred language indicator, termination triggers, and the like. In particular, an HLR

maintains and distributes to other MSCs (*e.g.*, foreign MSC 103) service profiles for

subscribers (*e.g.*, subscriber 120) that are assigned to it and "homed" to its corresponding

MSC (*e.g.*, home MSC 101). An HLR is implemented by a data processing system

associated with a corresponding MSC. HLR 121 represents a HLR for all mobile

20　subscribers assigned to MSC 101. Therefore, subscriber's 120 service profile is located

in HLR 121 which is within home market network 114. Although HLR 121 is illustrated separately from MSC 101, it should be appreciated that HLR 121 may not be physically separate from MSC 101, but may be performed by a computer that also operates MSC 101. Foreign MSC 103 is coupled to a visiting location register (VLR) 123. Like HLR

5 121, VLR 123 maintains and distributes to other MSCs (*e.g.,* home MSC 101) service profiles for subscribers assigned to it and "homed" to MSC 103. In the context of "roaming," VLR 123 may also store the service profiles of mobile units located within, but not subscribing to, foreign market network 113. For example, VLR 123 may store the service profile of subscriber 120. Therefore, VLR 123 includes a list of all mobile

10 subscribers currently registered with foreign MSC 103 visiting the region serviced by foreign MSC 103.

Generally, in operation, mobile subscriber 120 attempts to make a roaming mobile phone call while in foreign market network 113 by entering a directory number (DN) on the mobile telephone unit. When mobile subscriber 120 hits the "send" button

15 on the mobile telephone unit, a wireless signal 116 is transmitted to base station 108. Base station 108 relays a signal 117 to foreign MSC 103 in foreign market network 113. Foreign MSC then routes signal 117 to home MSC 101 over communication link 105 in order to verify a service profile for mobile subscriber 120 and establish a basis for subscriber's 120 payment of the call (*i.e.,* "HLR validity"). This assures the foreign

20 market provider that it will be compensated for its charges for handling the "roaming"

call originated by subscriber 120. The process of verifying the service profile must be

performed before subscriber 120 will be permitted to make a call through foreign market

network 113. Once home MSC 101 verifies subscriber 120, foreign MSC 103 will

complete the communication to the desired DN.

5

Service Profile Verification & Connection

When subscriber 120 travels from its home market network 114 to foreign market

network 113, foreign market network 113 will obtain the service profile of mobile

subscriber 120 before providing service to mobile subscriber 120. Therefore, in order to

10   use the mobile telephone device within foreign market network 113, subscriber 120 must

first register. The registration process begins when mobile subscriber 120 sends a

standard message to a closest base station corresponding to MSC 103.

Figure 2 is a message flow diagram illustrating the registration process that occurs

when mobile subscriber 120 makes a call while within foreign market network 113. The

15   relevant portion of PSTN 102 is shown as part of an Advanced Intelligent Network (AIN)

of a typical local exchange carrier. For the purpose of brevity, only a basic explanation

of the PSTN is provided. For further information regarding PSTNs in general and their

AIN aspects, the interested reader is referred to U.S. Patent No. 5,430,719, to Weisser,

entitled "Mediation of Open Advanced Intelligent Network Interface by Shared

20   Execution Environment," which is incorporated herein by reference.

As shown in Figure 2, at the moment subscriber 120 turns on the mobile unit in foreign market network 113, an IS-41 "registration notification" message is sent to foreign MSC 103 from mobile subscriber's 120 mobile unit. In step 201, foreign MSC 103 relays the "registration notification" message to HLR 121 in home MSC 101.

5 "Registration notification" message includes subscriber's 120 mobile identification number (MIN). When HLR 121 receives the "registration notification" message from foreign MSC 103, HLR 121 of MSC 101 begins to verify subscriber's 120 service profile. Assuming subscriber 120 has the proper credentials, in step 202, HLR 121 responds to the "registration notification" message by transmitting an IS-41 "registration

10 notification result" message. "Registration notification result" message includes the service profile associated with mobile subscriber 120. Upon receiving "registration notification result" message, foreign MSC 103 stores the included service profile for subscriber 120 within VLR 123. At this point, subscriber 120 is verified with foreign MSC 103, and thus foreign MSC 103 will complete any subsequent communication

15 requested by subscriber 120.

Subscriber 120 now enters desired DN 220 and enters "send." Assuming that the "validation field" in HLR 121 is set to a "per call" basis, foreign MSC 103 again will verify subscriber 120. In step 203, MSC 103 sends an IS-41 "registration request" message to home MSC 101. This time, the "registration request" message includes

20 subscriber's 120 desired DN 220. In step 204, home MSC 101 verifies subscriber 120

and sends an IS-41 "registration request return" message to MSC 103. "Registration

request return" message includes the verification along with desired DN 220. Once

foreign MSC 103 receives the "registration notification result" message it may bill the

call accordingly.

5   Foreign MSC 103 receives the "registration request return" message and, in step

205, routes subscriber's 120 call to a service switching point (SSP) 211 in PSTN 102.

SSP 211 is coupled to a service control point (SCP) 210. SCP 210 and SSP 211 are

located within the foreign market provider's geographic portion of PSTN 102. In step

206, SCP 210 directs SSP 211 to route the call to desired DN 220, thus completing the

10   transaction. It should be appreciated that although one SCP 210 is shown in Figure 2 for

the purpose of simplicity, in practice, there may be many SCPs in various locations used

to route the call from MSC 103 to desired DN 220.

Roaming Virtual Long Distance

15   Figure 3 is a message flow diagram illustrating the messaging that occurs when

mobile subscriber 120 makes a call while within foreign market network 113, according

to the invention. At the moment subscriber 120 turns on the mobile unit in foreign

market network 113, an IS-41 "registration notification" message is sent to foreign MSC

103. In step 301, foreign MSC 103 relays the "registration notification" message to HLR

20   121 in home MSC 101. "Registration notification" message includes subscriber's 120

mobile identification number (MIN). When HLR 121 receives the "registration

notification" message from foreign MSC 103, HLR 121 of MSC 101 begins to verify

subscriber's 120 service profile. Assuming subscriber 120 has the proper credentials, in

step 302, HLR 121 responds to the "registration notification" message by transmitting an

5   IS-41 "registration notification result" message. "Registration notification result"

message includes the service profile associated with mobile subscriber 120. Upon

receiving "registration notification result" message, foreign MSC 103 stores the included

service profile for subscriber 120 within VLR 123. At this point, subscriber 120 is

verified with foreign MSC 103, and thus foreign MSC 103 will complete any subsequent

10   communication requested by subscriber 120.

Subscriber 120 now enters desired DN 220 and enters "send." Assuming that the

"validation field" in HLR 121 is set to a "per call" basis, subscriber 120 sends an

"Info_Direct" message to foreign MSC 103. In step 303, foreign MSC 103 passes the

"Info_Direct" message onto home MSC 101. The "Info_Direct" message includes

15   desired DN 220, as entered by subscriber 120, and subscriber's 120 MIN. Instead of

verifying subscriber 120, as discussed with reference to Figure 2, in step 304, home MSC

101 is programmed to route the "Info_Direct" message to a SSP 323. SSP 323 then

queries a SCP 320 to determine how to process the "Info_Direct" message provided by

MSC 101. SSP 323 and SCP 320 are located within the home market provider's

20   geographic portion of PSTN 102 (as shown in Figure 1).

SCP 320 directs a "800" service package application (SPA) 322 to query a "800"

database 321 for processing instructions. As a result of "800" dbase 321 look-up, SCP

320 initiates two events. First, SCP 320 sets a termination attempt trigger ("trigger") 324

on SSP 323. Trigger 324 corresponds with desired DN 220 such that when trigger 324 is

5   encountered by an incoming call it automatically will re-route the call to desired DN 220.

Second, trigger 324 is set to re-route automatically an incoming call to a toll-free, "800"

telephone number. In step 305, this toll-free, "800" telephone number is returned to

home MSC 101.

In step 306, home MSC 101 provides a "registration return request" message to

10   foreign MSC 103. Instead of providing verification and returning desired DN 220, as

discussed with reference to Figure 2, the "registration return request" provided by foreign

MSC 103 has the toll-free, "800" telephone number provided by SCP 320. As a result, in

step 307, foreign MSC 103 routes the toll-free, "800" call to SSP 211. In step 308, SCP

210 directs SSP 211 to route the call to SSP 323 as a toll-free, "800" telephone number.

15   As the toll-free, "800" call enters SSP 323 it encounters trigger 324 previously set in SSP

323, following step 304. Trigger 324 reacts to the toll-free, "800" telephone number by

querying SCP 320. In step 309, SCP 320 directs SSP 323 to route the incoming "800"

call to desired DN 220. Therefore, unlike the message flow of Figure 2, where foreign

market MSC 103 allowed its local SSP 211 to call desired DN 220, the message flow of

20   Figure 3 directs SSP 211 to dial a toll-free "800" telephone number so that home MSC

101 may allow its local SSP 323 to call desired DN 220. Because SSP 211 contacts a toll-free, "800" telephone number, and because SSP 323 routes the call to desired DN 220, there are no connection costs from the foreign market provider.

In another embodiment, the wireless telephone used by mobile subscriber 120

5   may be programmed to perform similar functionality as described above. Figure 4 is a flow diagram illustrating such a wireless telephone device, according to the invention. In particular, the wireless telephone may be programmed to dial the toll-free "800" telephone number whenever it recognizes that it is "roaming" out of its home market.

As shown in Figure 4, in step 401, the mobile subscriber enters desired DN 220

10   while out of the home market (*i.e.,* while "roaming"). In step 402, the wireless telephone device recognizes that it is roaming. In step 403, the wireless telephone device is programmed to automatically dial the toll-free telephone number of home MSC 101. Upon receiving the call from the wireless telephone, in step 404, home MSC 101 determines whether the wireless telephone is capable of sending desired DN 220 along

15   with the request to connect to the toll-free telephone number (*i.e.,* two-stage dialing). In step 405, if home MSC 101 determines that the wireless telephone is capable of two-stage dialing, it receives and processes desired DN 220 by connecting subscriber 120 to desired DN 220. In step 406, if home MSC 101 determines that the wireless telephone is not capable of two-stage dialing, home MSC 101 determines whether the wireless

20   telephone is capable of storing desired DN 220 after initiating the call. If home MSC 101

determines that the wireless telephone is capable of storing desired DN 220, in step 407,

home MSC 101 automatically requests desired DN 220 from the wireless telephone and

connects subscriber 120 to desired DN 220. If home MSC 101 determines that the

wireless telephone is not capable of storing desired DN 220, in step 408, home MSC 101

5   queries subscriber 120 to re-enter desired DN 220. Home MSC 101 then connects

subscriber 120 to desired DN 220. In each of the above cases, the home market connects

subscriber 120 to desired DN 220 without requiring the services (and also the undesired

costs) of the foreign market provider.

The invention is directed to a communications system and method for connecting

10   an out-of-market customer to a desired telephone number without incurring connection

costs from a foreign market provider. The invention, however, is not limited to the

transport of voice data, regardless of any specific description in the drawing or examples

set forth herein. It also will be understood that the present invention is not limited to use

of any of the particular components or devices herein. Indeed, this invention can be used

15   in any application that requires the transmission of data. In addition, although the

invention was described as with reference to the dialing of "toll-free" telephone numbers,

it should be appreciated that such numbers may include any signal or combination of

characters and/or digits that do not incur costs from the foreign market provider to the

home market provider. Accordingly, the term "toll free" as used to describe the invention

20   should not be limited to any set of telephone numbers or characters currently understood

to have such effect. Further, the system disclosed in the present invention can be used with the method of the present invention or a variety of other applications.

While the present invention has been particularly shown and described with reference to the presently preferred embodiments thereof, it will be understood by those skilled in the art that the invention is not limited to the embodiments specifically disclosed herein. Those skilled in the art will appreciate that various changes and adaptations of the present invention may be made in the form and details of these embodiments without departing from the true spirit and scope of the invention as defined by the following claims.

What is Claimed is:

1. A method of connecting an out-of-market customer to a desired telephone number, comprising:

5   receiving a customer validation request from a foreign market provider;

            providing a toll-free telephone number to said foreign market provider; and

            directing a call request from said foreign market provider to said desired telephone number, wherein said call request is based on said provided toll-free telephone

10   number.

2. The method of claim 1, wherein said customer validation request includes said desired telephone number.

15   3. The method of claim 1, wherein said customer validation request includes a mobile identification number.

4. The method of claim 1, wherein said toll-free telephone number is assigned to a home market provider.

20

5. The method of claim 1, wherein said toll-free telephone number is an 800 telephone number.

6. The method of claim 1, further comprising directing said call request to said desired

5   telephone number using a service package application.

7. The method of claim 1, wherein said providing further comprises randomly selecting said toll-free number.

10   8. A telecommunications system for connecting an out-of-market customer to a desired telephone number, comprising:

a home mobile switching center in communication with a foreign mobile switching center;

a service switching point in communication with said home mobile

15   switching center and with said desired telephone number; and

a service control point in communication with said service switching point, wherein said service control point instructs said service switching point to route a call request received from said foreign mobile switching center to said desired telephone number.

20

9. The system of claim 8, further comprising at least one mobile telephone unit located within said foreign market, wherein said mobile telephone unit subscribes to said home mobile switching center.

5   10. The system of claim 8, wherein said service switching point further comprises a trigger that is set by said service control point.

11. The system of claim 10, wherein said service control point further comprises a service package application that processes said call request and instructs said service control

10   point to set said trigger such that said call request encounters said trigger.

12. The system of claim 8, wherein said foreign mobile switching center communicates a customer validation request to said home mobile switching center.

15   13. The system of claim 12, wherein said customer validation request includes said desired telephone number.

14. The system of claim 12, wherein said customer validation request includes a mobile identification number.

20

15. The system of claim 8, wherein said call request is based on a toll-free telephone number.

16. The system of claim 15, wherein said toll-free telephone number is a pre-determined
5 sequence of characters.

17. The system of claim 15, wherein said toll-free telephone number is randomly selected.

10 18. A wireless telephone device for connecting an out-of-market customer to a desired telephone number, comprising a computer-readable medium having computer-executable instructions thereon for:

determining whether said wireless telephone device is out of a home market;

15 receiving a desired destination telephone number; and

transmitting a call request to a toll-free telephone number in response to said desired telephone number when said wireless telephone device is out of a home market.

19. The computer-readable medium of claim 18, having further computer-executable instructions thereon for transmitting said desired destination telephone number with said call request to said toll-free telephone number.

20. The computer-readable medium of claim 18, having further computer-executable instructions thereon for storing said desired destination number after transmitting said call request and transmitting said desired destination telephone number in response to a request directed from said toll-free telephone number.

21. The computer-readable medium of claim 18, having further computer-executable instructions thereon for querying a user to re-enter said desired destination telephone number in response to a request directed from said toll-free telephone number.

22. A method of routing an out-of-market customer to a desired telephone number without incurring connection costs from a foreign market provider, comprising:

receiving a customer validation request from said foreign market provider, wherein said customer validation request includes said desired telephone number and a mobile identification number;

providing a toll-free telephone number to said foreign market provider,

wherein said toll-free telephone number is an 800 telephone number owned by a home

market provider; and

      directing a toll-free call request from said foreign market provider to said

desired telephone number.

Abstract

The invention provides a system and a method for connecting an out-of-market customer to a desired telephone number. The method comprises receiving a customer validation request from a foreign market provider and, in return, providing a random or designated toll-free telephone number to the foreign market provider. Upon receiving a call request from the foreign market provider, the call request is directed to the desired telephone number. The customer validation request may include the desired telephone number and/or a mobile identification number. The call request is based on the provided toll-free telephone number, which is owned by a home market provider.

5

10

Figure 1

Figure 2

HLR
121

Home MSC
101

SCP
210

SSP
211

PSTN
102

206 - Route Call to DN

205 - Route Call to DN

204 - Reg Request Return (DN + Confirm)

203 - Origination Request (DN + MIN)

202 - Reg Notification Result

201 - Reg Notification

Desired DN
220

Foreign MSC
103

VLR
123

Figure 3

401

Mobile subscriber enters desired DN while out of home market ("roaming")

↓

402

Wireless telephone recognizes that it is out of home market

↓

403

Wireless telephone automatically dials toll-free telephone number of home MSC

↓

404

Is wireless telephone capable of two-stage dialing?

—Yes→

405

Wireless telephone transmits desired DN to Home MSC & subscriber is connected to DN

No ↓

406

Can wireless telephone store DN after initiating call?

—Yes→

407

Home MSC automatically requests desired DN from wireless telephone & subscriber is connected to DN

No ↓

408

Home MSC queries subscriber to re-enter desired DN & subscriber is connected to desired DN
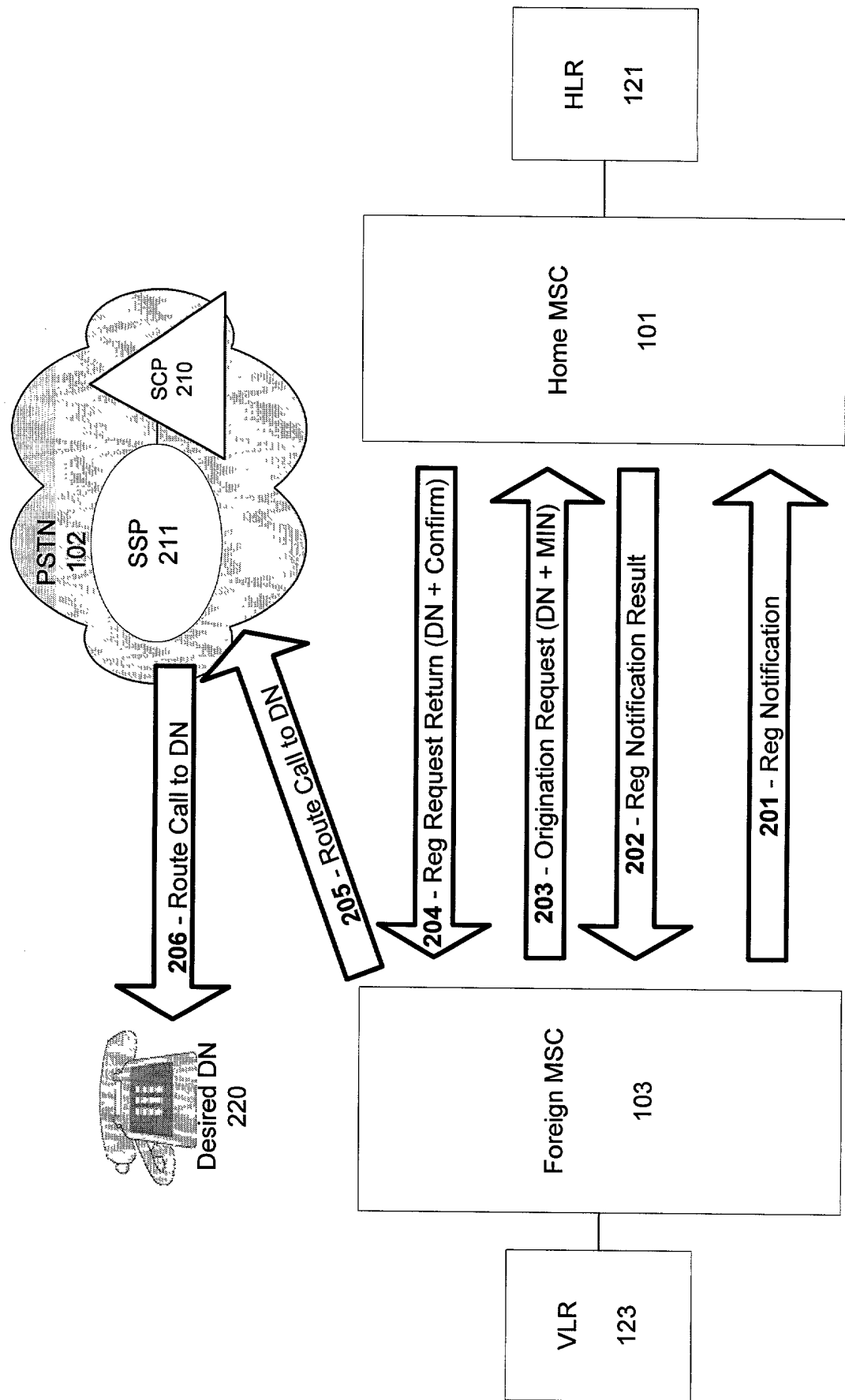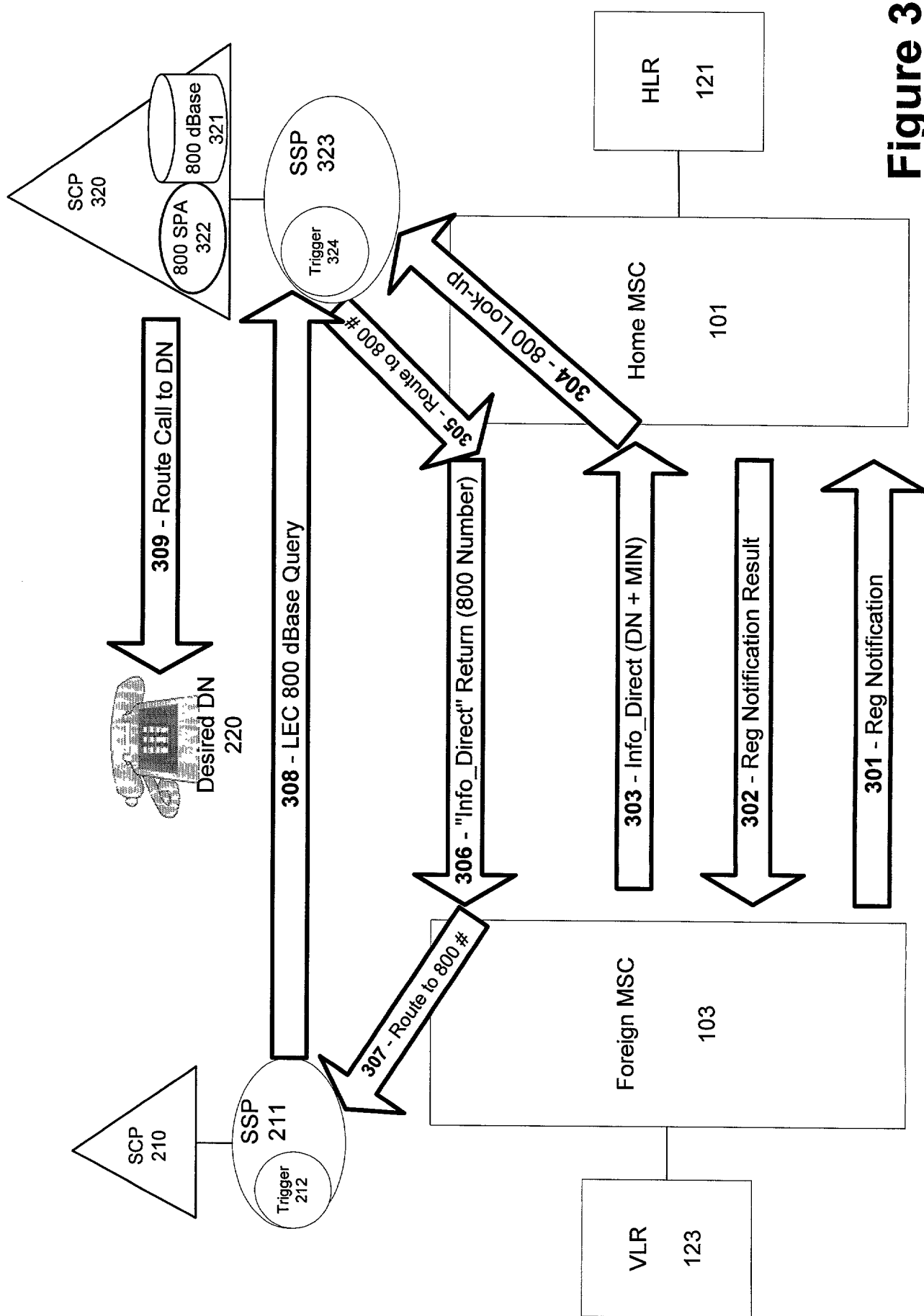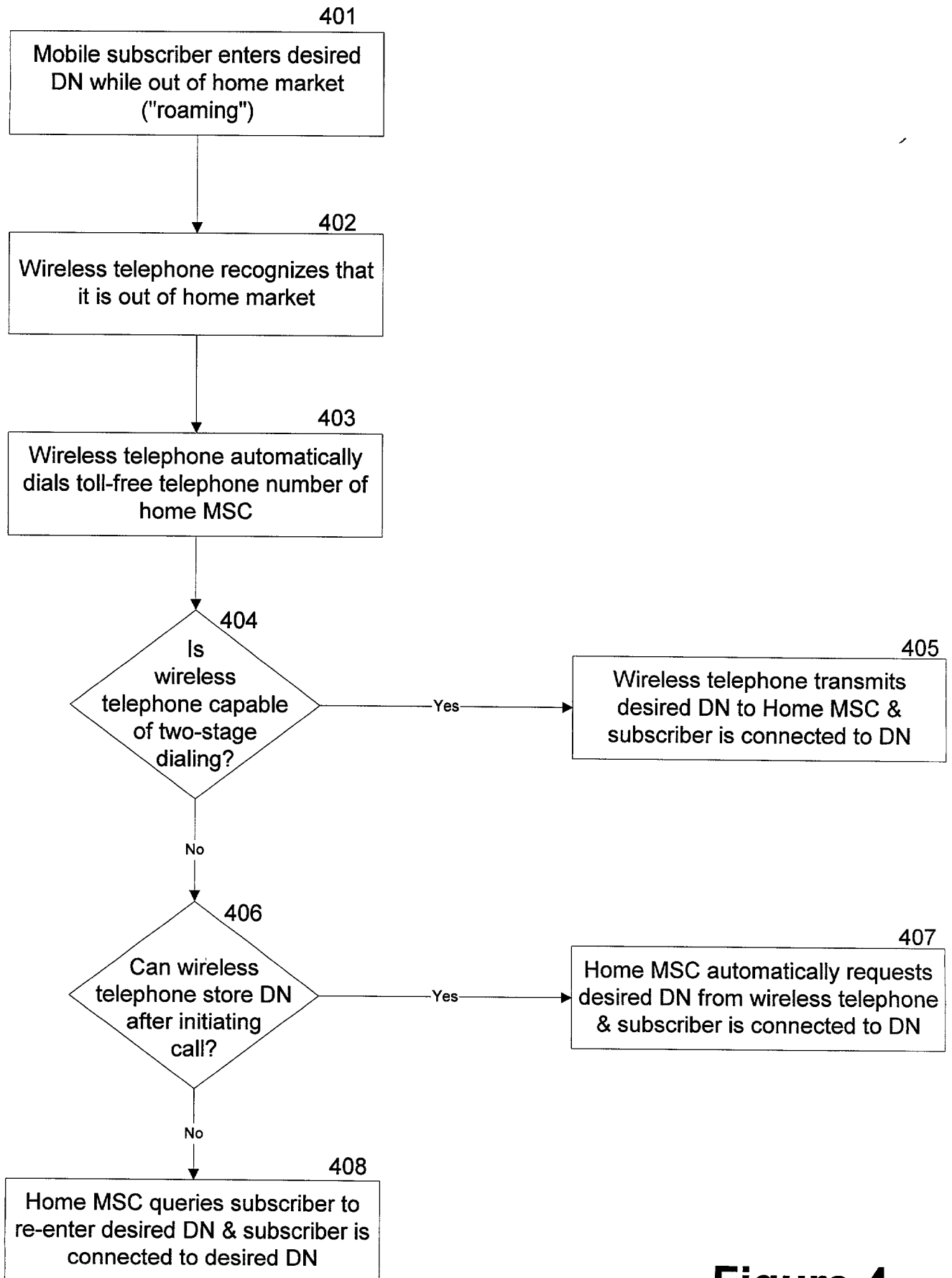
Figure 4

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Charles M. Link II and Donald M. Cardina   **Group Art Unit:** N/A

Examiner: N/A

**For: ROAMING VIRTUAL LONG
          DISTANCE**

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; and

I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a

☒   Utility Patent   ☐   Design Patent

is sought on the invention, whose title appears above, the specification of which:

☒   is attached hereto.
☐   was filed on _____ as Serial No. _____ .
☐   said application having been amended on _____ .

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to be material to the patentability of this application in accordance with 37 CFR § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a-d) of any **foreign application(s)** for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of any application on which priority is claimed:

Priority Claimed (If X'd)	Country	Serial Number	Date Filed
☐	_____	_____	_____
☐	_____	_____	_____
☐	_____	_____	_____
☐	_____	_____	_____

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to be material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

Serial Number	Date Filed	Patented/Pending/Abandoned
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below:

Serial Number	Date Filed
_____	_____
_____	_____

I hereby appoint the following persons of the firm of **WOODCOCK WASHBURN KURTZ MACKIEWICZ & NORRIS LLP**, One Liberty Place - 46th Floor, Philadelphia, Pennsylvania 19103 as attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

      Steven J. Rocci   Reg. No. 30,489

      Vincent J. Roccia   Reg. No. 43,887

Address all telephone calls and correspondence to:

> Vincent J. Roccia
> **WOODCOCK WASHBURN KURTZ**
> **MACKIEWICZ & NORRIS LLP**
> One Liberty Place - 46th Floor
> Philadelphia PA 19103
> Telephone No.: **(215) 568-3100**
> Facsimile No.: **(215) 568-3439**

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name: Charles M. Link II	
Mailing Address: 465 Abbywood Drive	**Signature**
City/State of Actual Residence: Roswell, GA 30075	**Date of Signature:** _____ **Citizenship:** ___United States___

Name: Donald M. Cardina	
Mailing Address: 1026 Eagles Ridge Court	**Signature** **Date of Signature:** _____
City/State of Actual Residence: Lawrenceville, GA 30043	**Citizenship:** United States _____